

This Page Is Inserted by IFW Operations  
and is not a part of the Official Record

## **BEST AVAILABLE IMAGES**

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

**IMAGES ARE BEST AVAILABLE COPY.**

**As rescanning documents *will not* correct images,  
please do not report the images to the  
Image Problem Mailbox.**

**THIS PAGE BLANK (USPTO)**

T 382/435

05-1950-11

355  
345

FIG. 1.

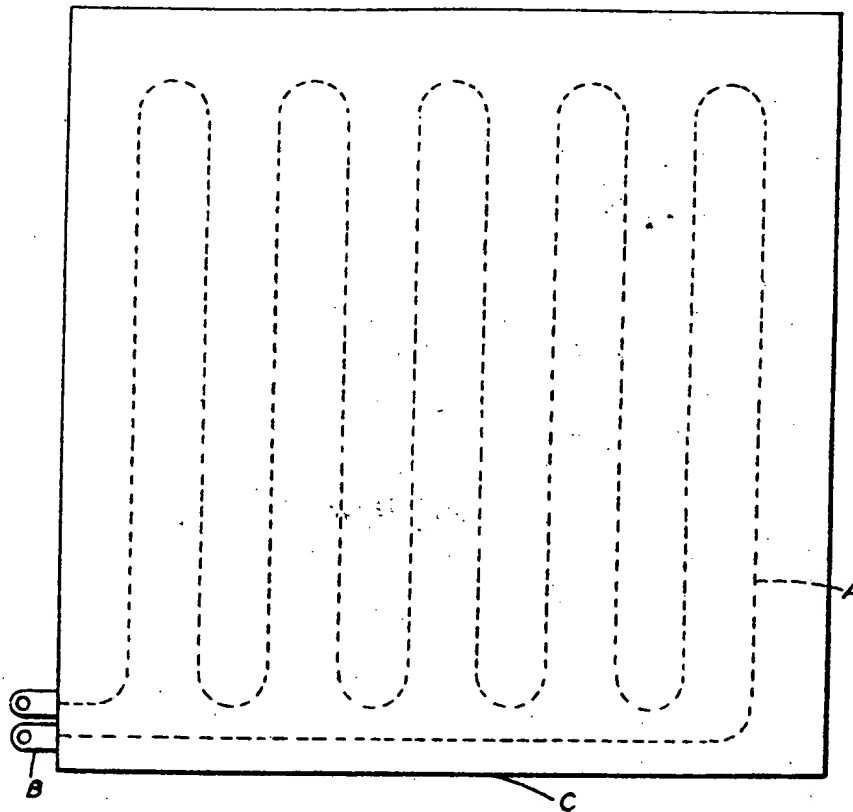
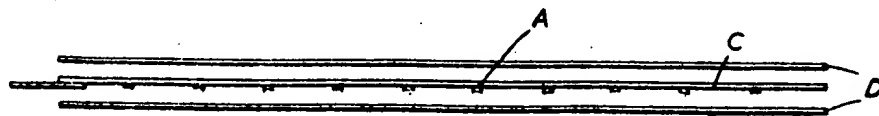


FIG. 2.



[This Drawing is a reproduction of the Original on a reduced scale.]

**THIS PAGE BLANK (USPTO)**

# PATENT SPECIFICATION

Inventor: JOHN ALBERT LENO.



646.940

Date of filing Complete Specification: Sept. 3, 1948.

Application Date: Sept. 8, 1947.

No. 24653/47.

Complete Specification Published: Nov. 29, 1950.

Index at acceptance:—Class 39(iii), H1(c: e), H2e4(b: c: f).

## PROVISIONAL SPECIFICATION

### Electrical Heating Panels

We, STANDARD TELEPHONES AND CABLES LIMITED, a British Company, of Connaught House, 63, Aldwych, London, W.C.2, England, do hereby declare the nature of this invention to be as follows:—

This invention relates to electrical heating panels of thin section and more particularly to such panels which are suitable for the low temperature warming of e.g. rooms, linen cupboards, and beds.

An object of the invention is to provide light, shockproof and where required flexible, heating panels.

It is well known that sheets of paper, previously impregnated with a selected resin, may be moulded together under heat and pressure to form panels or boards.

It is proposed to include, during the assembly of resin-impregnated insulating sheets to form a panel of thin section, at least one sheet having mounted or printed on it a length of electrical heating element.

The invention will be more clearly understood from the following description of an embodiment shown in the accompanying drawings in which:—

Fig. 1 shows an elevation of a sheet of insulating material containing a heating element.

Fig. 2 shows an exploded plan view of a heating panel.

Referring to Fig. 1, the resin-impregnated insulating sheet is provided with a heating element A of a length and gauge compatible with the size of panel

and degree of heating required. This element is shown laced into the sheet and is brought out either as an insulated conductor or to tags such as B. Alternatively the conductor may be printed or otherwise deposited as a feature on the surface of the sheet.

In Fig. 2 the sheet O containing the heating element will be seen to be interleaved between sheets of insulating material D. It will be clear to those skilled in the art that all these insulating sheets may be of certain plastic materials or of resin-impregnated fabric equally well as of like treated paper.

Where panels are required to be sturdy rather than flexible then further sheets are added to one side of the panel during assembly.

The sheet containing the heating element remains at the same distance from the radiating surface as previously. This is because the ability to conduct the heat dissipated in the element to the radiating surface is an important feature in the design of such panels. With sturdier panels, such as would be suitable for dividing walls, it may prove desirable to include a sheet having a heating element close to each one or both radiating surface.

External objects may have decorative finishes, e.g. imitation marble, walnut or oak.

Dated this 8th day of September, 1947.

U. JOHN PRIOR,  
Chartered Patent Agent,  
For the Applicants.

## COMPLETE SPECIFICATION

### Electrical Heating Panels

We, STANDARD TELEPHONES AND CABLES LIMITED, a British Company, of Connaught House, 63, Aldwych, London, W.C.2, England, do hereby declare the

[Price 2/-]

nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

- 5 This invention relates to electrical heating panels of thin section and their manufacture, and more particularly to such panels which are suitable for the low temperature warming of e.g. rooms, 10 linen cupboards, and beds.

An object of the invention is to provide light, shockproof and where required flexible, heating panels.

- The main feature of the invention is a 15 method of manufacturing a space heating panel incorporating one or more embedded electric heating elements, in which at least one of a plurality of insulating sheets of, or incorporating, thermo- 20 plastic or thermosetting materials has printed or otherwise deposited thereon a metallic track, each track constituting a heating element, and in which the said sheets are superimposed and moulded 25 together by the application of heat and pressure thereto.

- It is well known that sheets of paper, previously impregnated with a selected resin, may be moulded together under 30 heat and pressure to form panels or boards.

- It is proposed to include, during the assembly of resin-impregnated insulating sheets to form a panel of thin section, at 35 least one sheet having printed on it a length of electrical heating element.

- The invention will be more clearly understood from the following description of an embodiment shown in the drawing 40 accompanying the provisional specification in which:—

Fig. 1 shows an elevation of a sheet of insulating material containing a printed heating element.

- 45 Fig. 2 shows an exploded plan view of a heating panel.

- Referring to Fig. 1, the resin-impregnated insulating sheet is provided with a heating element A in the form of 50 a printed or otherwise deposited metallic track of a length and thickness compatible with the size of panel and degree of heating required. This element is brought out to tags such as B.

- 55 Two methods of producing metallic films on non-metallic surfaces are disclosed and claimed in Patent Specification 569,388 and Application No. 10985/47 (Serial No. 646,921) respectively. With the metallic paste disclosed 60 in either Specification the initially deposited track is non-conducting and the heat and pressure moulding operation, by means of which a unitary panel 65 is formed, has the additional effect of

rendering the metallic deposit conducting.

In Fig. 2 the sheet C containing the heating element will be seen to be interleaved between sheets of insulating 70 material D. The thickness of the tracks A has been exaggerated so that they show clearly. It will be clear to those skilled in the art that all these insulating 75 sheets may be of certain thermoplastic or thermosetting materials or of resin-impregnated fabric equally well as of like treated paper.

Where panels are required to be sturdy rather than flexible then further sheets 80 are added to one side of the panel during assembly.

The sheet containing the heating element remains at the same distance from the radiating surface as previously. 85 This is because the ability to conduct the heat dissipated in the element to the radiating surface is an important requirement in the design of such panels. With 90 sturdier panels, such as would be suitable for dividing walls, it may prove desirable to include a sheet having a heating element close to each one or both radiating surface.

External surfaces may have decorative 95 finishes, e.g. imitation marble, walnut or oak.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to 100 be performed, we declare that what we claim is:—

1. A method of manufacturing a space heating panel incorporating one or more embedded electric heating elements, in 105 which at least one of a plurality of insulating sheets of, or incorporating, thermoplastic or thermosetting materials has printed or otherwise deposited thereon a metallic track, each track constituting a 110 heating element, and in which the said sheets are superimposed and moulded together by the application of heat and pressure thereto.

2. A method as claimed in claim 1 in 115 which the said sheets are of resin impregnated paper.

3. A heating panel manufactured in accordance with the method claimed in claim 1 or 2. 120

4. A heating panel as claimed in claim 3 and which is flexible.

5. A heating panel as claimed in claim 3 and which is inflexible.

6. A method of manufacturing a heating panel substantially as described with 125 reference to the drawings accompanying the provisional specification.

7. A heating panel manufactured in accordance with the method claimed in 130

claim 6 substantially as described and as shown in the drawings accompanying the provisional specification.

Dated this 3rd day of September, A.D. 1948.

U. JOHN PRIOR,  
Chartered Patent Agent,  
For the Applicants.

Leamington Spa: Printed for His Majesty's Stationery Office, by the Courier Press.—1950.  
Published at The Patent Office, 25, Southampton Buildings, London, W.C.2, from which  
copies, price 2s. 0d each (inland) 2s. 1d. (abroad) may be obtained.

**THIS PAGE BLANK (USPTO)**



GB 0863928  
MAR 1961

863,928

2 SHEETS

COMPLETE SPECIFICATION

This drawing is a reproduction of  
the Original on a reduced scale.

SHEETS 1 & 2

Fig.3

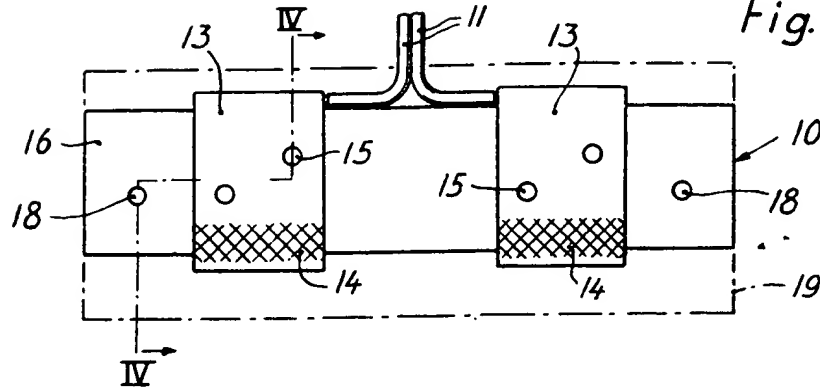


Fig.4

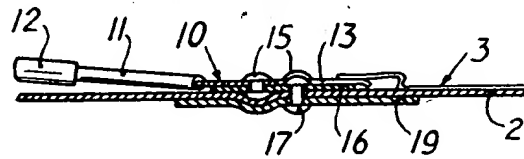
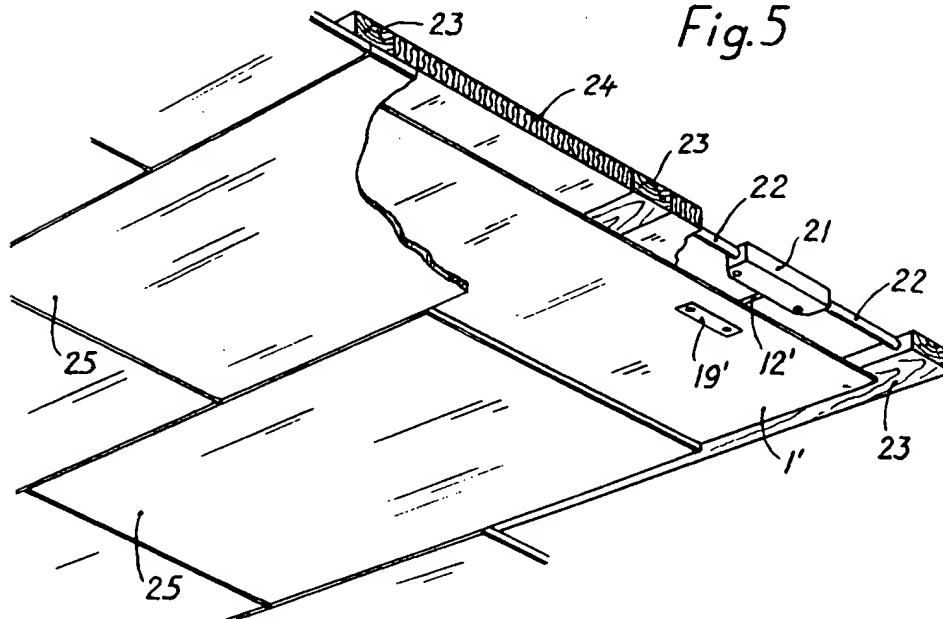
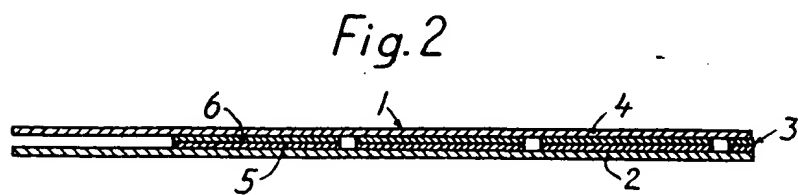
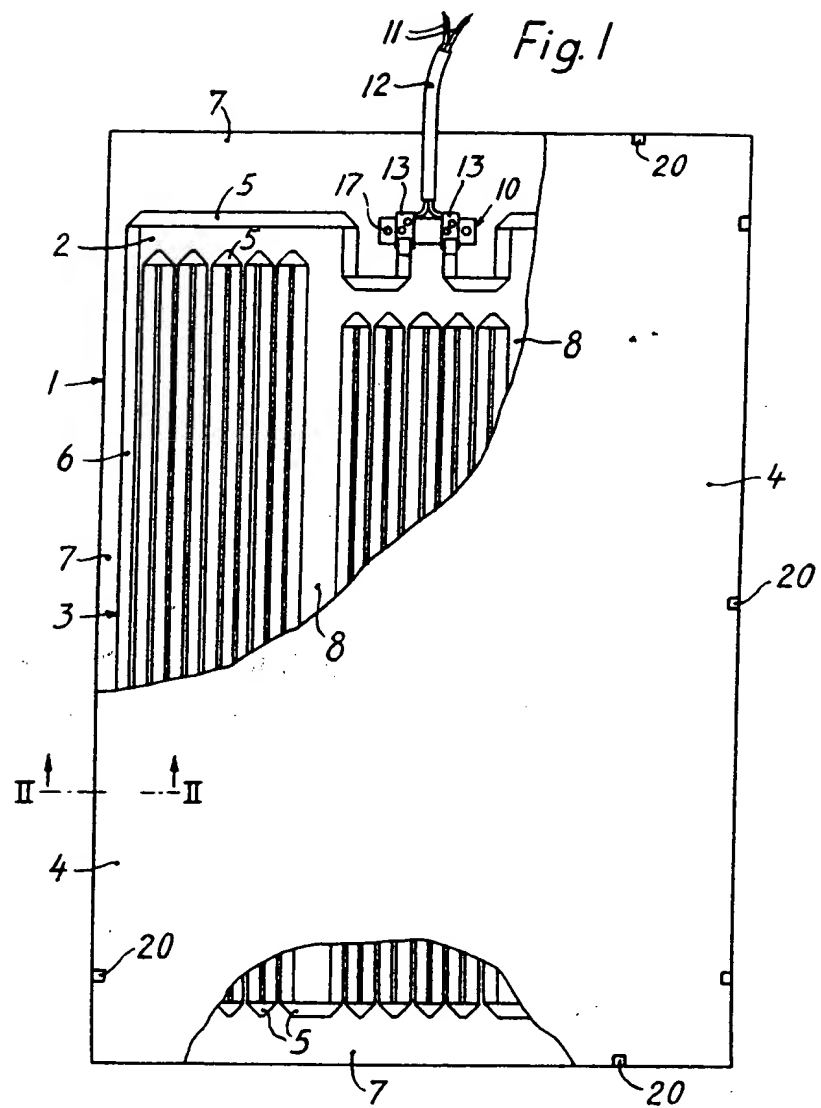


Fig.5



**THIS PAGE BLANK (USPTO)**



**THIS PAGE BLANK (USPTO)**